FROM THE MAKERS OF WOLFRAM LANGUAGE AND MATHEMATICA

WolframAlpha

e^ipi

Assuming i is the imaginary unit

## Input

$e^{i\pi}$

## Result

$-1$

Step-by-step solution

*Wolfram|Alpha Step-by-step solution*

Result:

STEP 1

Simplify the following:
$e^{i\pi}$

Hint: Evaluate $e^{i\pi}$



## Number line

$-1.5$ $-1.0$ $-0.5$

## Alternative representations

$e^{i\pi} = (-1)^{-i\,i}$

$e^{i\pi} = e^{180\,°\,i}$

$e^{i\pi} = e^{-i^2 \log(-1)}$

$e^{i\pi} = \exp^{i\pi}(z)$ for $z = 1$

$e^{i\pi} = \exp^{i\,180\,°}(z)$ for $z = 1$

$e^{i\pi} = e^{2\,i^2 \log((1-i)/(1+i))}$

$e^{i\pi} = \exp^{i(-i)\log(-1)}(z)$ for $z = 1$

$e^{i\pi} = \exp^{i\,2\left(i \log\left(\frac{1-i}{1+i}\right)\right)}(z)$ for $z = 1$

Less

## Series representations

$$e^{i\pi} = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{4 i \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$e^{i\pi} = \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{4 i \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$e^{i\pi} = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{i \sum_{k=1}^{\infty} 4^{-k}\left(-1+3^k\right)\zeta(1+k)}$$

$$e^{i\pi} = \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{4 i \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$e^{i\pi} = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{4 i \sum_{k=1}^{\infty} \tan^{-1}\left(1/F_{1+2k}\right)}$$

$$e^{i\pi} = \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{4 i \sum_{k=1}^{\infty} \tan^{-1}\left(1/F_{1+2k}\right)}$$

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Less

## Integral representations

$e^{i\pi} = e^{2 i \times \int_0^{\infty} 1/\left(1+t^2\right) dt}$

$e^{i\pi} = e^{4 i \int_0^1 \sqrt{1-t^2}\, dt}$

$e^{i\pi} = e^{2 i \int_0^{\infty} \sin(t)/t\, dt}$

$e^{i\pi} = e^{2 i \int_0^{\infty} \sin^2(t)/t^2\, dt}$

$e^{i\pi} = e^{3 i \int_0^{\infty} \sin^4(t)/t^4\, dt}$

$e^{i\pi} = e^{(8 i)/3 \int_0^{\infty} \sin^3(t)/t^3\, dt}$

$e^{i\pi} = e^{(40 i)/11 \int_0^{\infty} \sin^6(t)/t^6\, dt}$

$e^{i\pi} = e^{(384 i)/115 \int_0^{\infty} \sin^5(t)/t^5\, dt}$

Less

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